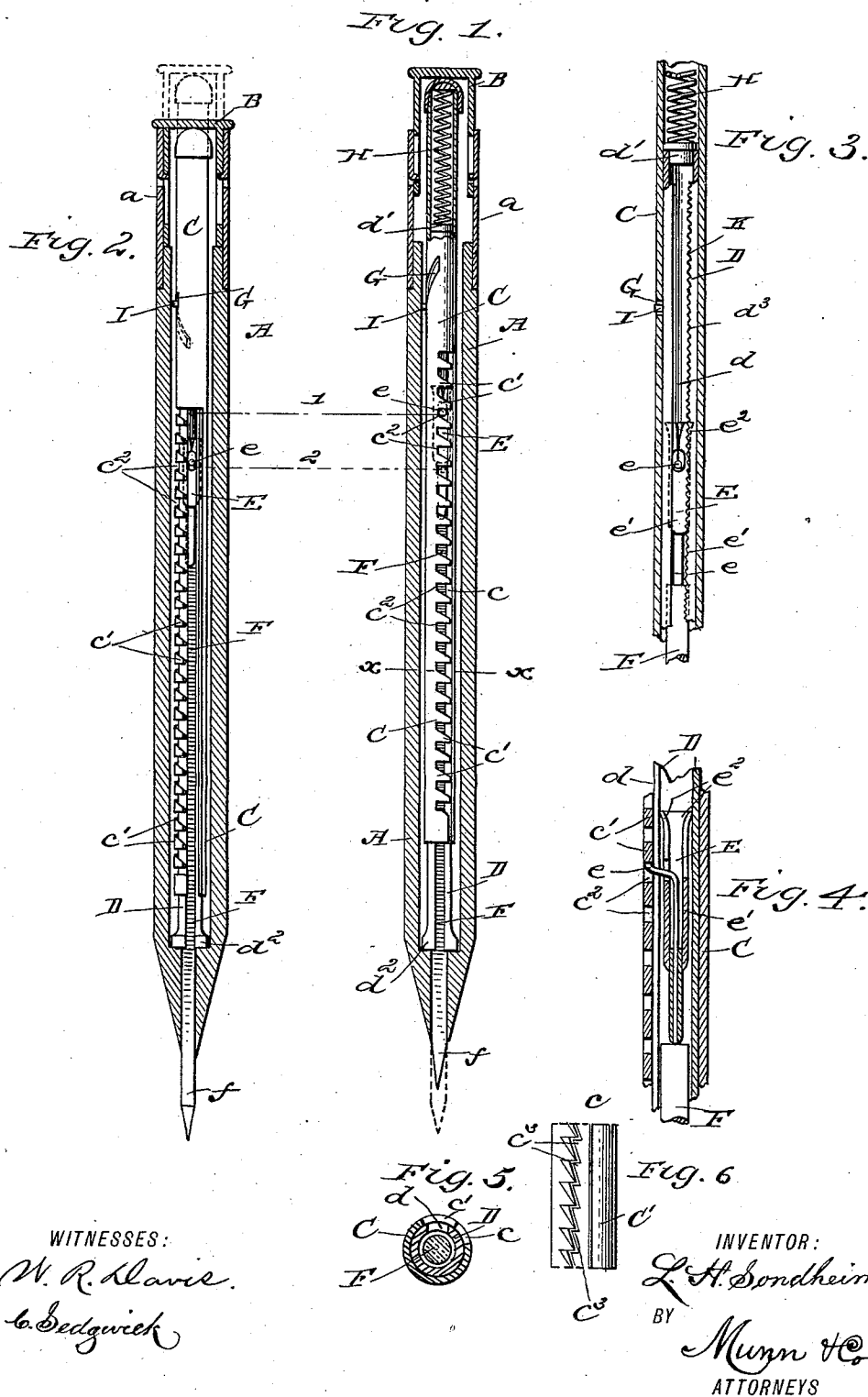


(No Model.)

L. H. SONDHEIM.
PENCIL.

No. 469,754.

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UNITED STATES PATENT OFFICE.

LEWIS H. SONDEHEIM, OF NEW YORK, N. Y.

PENCIL.

SPECIFICATION forming part of Letters Patent No. 469,754, dated March 1, 1892.

Application filed August 9, 1890. Serial No. 361,530. (No model.)

To all whom it may concern:

Be it known that I, LEWIS H. SONDEHEIM, of the city, county, and State of New York, have invented a new and Improved Pencil, of which the following is a full, clear, and exact description.

My invention has for its object to provide a simple, inexpensive, and efficient pencil having a casing which is preferably made of wood and retains its original length or is not to be cut away as the lead wears away, and holds a movable lead or crayon which may be fed forward to furnish new writing-points as required, and may be pushed backward by pressure on its point to protect it within the pencil-casing when not in use.

The invention will first be described, and then will be defined in claims hereinafter set forth.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal sectional view of my improved pencil with the lead-adjusting mechanism in normal positions; Fig. 2 is a like sectional view, but with the cap pressed forward for feeding the lead to provide a new writing-point. Fig. 3 is a detail sectional side view of portions of the feed-tube, the lead-tube, the traveler, and the lead, all removed from the pencil-casing and drawn to larger scale than in Figs. 1 and 2. Fig. 4 is a still more enlarged sectional view of portions of the feed-tube, the lead-tube, the traveler, and the lead, and taken in a plane at right angles to Fig. 3. Fig. 5 is a cross-section of the pencil, taken on the line $x x$ in Fig. 1, but drawn to a larger scale; and Fig. 6 is a detail view showing a modified form of the lead-feeding tube.

The casing A of the pencil is preferably made of wood tapered at the forward end and bored out longitudinally to receive the lead or crayon and its holding and adjusting mechanism, presently described. At its back end the casing is preferably provided with a ferrule a , to which is fitted a longitudinally-sliding cap B, which is retained by impressed studs or lips on the ferrule entering slots of the cap in the usual manner. In the bore of the casing is placed loosely a feed-tube C, inside of which is fitted a lead-tube D, which

may be fastened at its forward end to the inside of the casing or which may be held stationary or against rotary movement by a close fit and consequent frictional contact of its head or enlarged forward end d^2 with the walls of the bore of the casing. I prefer to fit the enlarged end d^2 of the tube just loosely enough in the bore of the pencil-casing to allow the tube to have rotary motion therein, as by this construction the tube will not cause splitting of the casing when the latter is made of wood and is swelled by dampness, and its bore is consequently contracted, and the end or head d^2 also obviates lateral breaking strains on the lead where it passes through the bore at the tapered end of the casing. Within the lead-tube D is placed loosely a traveler E, which carries a spring-pawl extending from said traveler into and through a slot in the lead-tube D and into recesses or openings in the feed-tube C and operates directly upon the lead F in the tube D to feed the lead forward as the cap B is pressed forward, and as hereinafter more fully explained.

The feed-tube C is provided with a lengthwise slot c , along one side of which are formed teeth c' , producing between them notches c^2 , which receive the acting end of the traveler-pawl which is engaged by the teeth. The feed-tube teeth c' are preferably shaped with a square or right-angularly-disposed front edge, which engages the traveler-pawl, and an oblique or slanting rear edge, allowing the teeth to easily slip under the pawl as the latter clicks from one recess or notch c^2 to the other during the backward movement of the feed-tube. I may produce the teeth and notches $c' c^2$ by any approved cutting or stamping operation on the metal of the feed-tube. Fig. 6 of the drawings illustrates how I may produce the full equivalent of these teeth and notches by a stamping or pressing operation at one edge of the tube-slot c of a feed-tube C', thereby forming a series of outwardly-projecting angular pockets or teeth c^3 , the rear ends of which are at about right angles to the body of the feed-tube, like the front edges of the cut or stamped teeth c' , above mentioned. The outside edges or portions of these pockets or teeth c^3 range diagonally or obliquely where they merge into the rounded body of metal of the feed-tube, which form of the pock-

ets or teeth allows the traveler-pawl to click easily from one pocket to another during the backward movement of the feed-tube.

In the preferred form of the invention the feed-tube C is provided above the slot *c* with an oblique slot G, which has a uniform width and makes about one quarter-turn around the tube, while the lead-tube is provided with a fixed pin or stud I, which projects into the feed-tube slot G. As the pin quite fills the slot it is obvious that as the cap B is pressed forward to press the feed-tube likewise the feed-tube will be simultaneously turned at a continuous or uniform speed of rotation until the back end of the slot G strikes the lead-tube pin I. Between the closed fixed cap of the feed-tube and a plug-cap *d'*, fitted loosely so as to turn in or on the back end of the lead-tube D, is placed a spring H, which is compressed as the cap is pressed forward to advance the feed-tube, as above described, and which normally expands to throw back the feed-tube and cap after pressure is removed from the cap. The loose plug-cap *d'* of the lead-tube is free to turn more or less on or in this tube or between it and the spiral spring H to relieve friction by avoiding torsional strains on the spring as the feed-tube partially rotates when pressed forward by the cap. Manifestly the oblique slot G may be made in the lead-tube D, and the pin I entering said slot may be fixed to the feed-tube to give the same operative results in turning the feed-tube on the lead-tube as the cap is pressed forward, and I consider this reversed arrangement of the slot and pin to be within the scope of my invention.

The lead-tube D has a lengthwise slot *d*, through which projects the outer free end of the traveler-pawl *e*, which is preferably made of an elastic wire fastened in the forward end of the body portion *e'* of the traveler. As shown in the drawings, this body part *e'* of the traveler E is split and spread apart a little at *e²* at the back end to make of the traveler-body a self-contained spring and cause it to have ample friction on the feed-tube, within which it is placed to hold it against backward movement as the pawl *e* rides on the backwardly-moving teeth *c'* of the feed-tube C, by any one of which teeth the traveler is fed forward as the cap B is pressed forward. Instead of splitting and spreading the traveler at *e²* to give it frictional contact with the lead-tube, the traveler-body may be large enough in diameter throughout to have ample frictional contact with the interior of the lead-tube. As a further precaution against slipping backward of the traveler as the feed-tube moves backward, that edge or side wall of the lead-tube slot *d* which is farthest from the toothed side or edge of the feed-tube slot *c* may be serrated or corrugated, as shown at *d³* in Fig. 3 of the drawings. These serrations *d³* on the lead-tube allow the traveler-pawl *e* to click over or slide by them when a direct pressure is brought upon the traveler by the

engagement of one of the teeth *c'* with it as the feed-tube is pushed forward to carry the lead forward, or by pressure endwise of the pencil on the protruding lead-point to push the point within the casing and carry the traveler backward by the lead; but said serrations *d³* will resist backward movement of the pawl *e* sufficiently to detain the traveler when the pawl is pressed laterally or obliquely against said serrations by the obliquely-receding or semi-rotary movement of the feed-tube as it is carried backward by the spring H, when guided by the slot and pin G I, above mentioned.

It will be seen that in the above-described pencil the yielding shank of the spring-pawl lies mainly within the peripheral plane of the lead-tube, and its flexure or tension is in an outward direction to project its free end through the slot of the lead-tube to engage the feed-tube from the inside of the latter. By this construction not only may the tubes, and consequently the casing, be made of reduced diameter and a more compact pencil be produced, but the flexible pawl is guarded and protected and prevented from being wrenched or deflected from its proper position. This arrangement therefore is an important feature in pencils of this character, and I claim the same irrespective of the special construction of the feed-tube and irrespective of the special movements by which the traveler is progressed. Thus, for instance, in my application filed April 24, 1891, Serial No. 390,283, I have disclosed a construction wherein I am enabled to omit the longitudinal slot of the feed-tube. The present application is distinguished from my other above named in that the present one covers the pawl whose tension tends to throw it outward through the lead-tube and the coacting parts generically, without reference to the special form of the feed-tube, and also specifically in connection with a feed-tube having a longitudinal slot or equivalent longitudinal way.

My application Serial No. 390,283 relates specifically to the construction whereby the pencil is made operative without a longitudinal slot or way.

The operation of the pencil is very simple and effective. When it is desired to feed the lead or crayon F forward to obtain or renew a writing-point, it is only necessary to press the cap B forward, as shown in Fig. 2. This movement presses the feed-tube C forward on the lead-tube D and simultaneously causes the feed-tube to turn axially by the engagement of its oblique slot G with the pin or stud I of the relatively-stationary lead-tube. Before the feed-tube has turned sufficiently to cause one of its notches *c²* to clear the pawl *e* of the traveler E the tooth *c'* of the feed-tube which laid behind the pawl will have pushed the traveler forward some little distance or enough to cause the lead F to have been pushed or fed forward by the traveler to provide a writing-point *f* at the forward end of the pencil,

the distance the traveler and lead are moved forward being indicated by the dotted lines 1 and 2, extending between Figs. 1 and 2 of the drawings. As the pressure on the cap B is removed the spring H will instantly expand and carry the feed-tube C backward, as it turns axially while its oblique slot G is moving along the lead-tube pin I, and during this retracting movement the traveler-pawl *e* simply slips or clicks under the receding teeth *c* of the feed-tube, while the traveler is detained either by its friction against the lead-tube or when the serrations *d*³ are provided at the lead-tube slot. These further serve to prevent backward slip of the traveler in the lead-tube and as the feed-tube is fully retracted the pawl enters another notch *c*² of said tube ready to again advance the traveler and lead by the next pressure on the cap B, as above described.

To guard the lead or crayon point within the pencil it is only necessary to first press forward the cap B, to turn the teeth and notches *c'* *c*² of the feed-tube around clear of the traveler-pawl *e* or to the position shown in Fig. 2 of the drawings, and then press the point of the lead upon a desk or other resisting-surface to push back the lead with the traveler, as the traveler-pawls move in the feed-tube slot *c* and the lead-tube slot *d* until the lead is entirely within the casing. To again project the lead for use, it is only necessary to press the cap B forward to cause the feed-tube to advance the traveler and lead in a manner above explained.

When one lead or crayon F is used up, another one may be very quickly and easily inserted without removing any of the interior mechanism of the pencil by inverting the pencil and pressing its cap B inward on a desk or resisting-surface to bring the untoothed side portion of the feed-tube slot *c* in line with the slot *d* of the lead-tube, whereupon the lead will be inserted and pushed into the casing, carrying the traveler backward with it, and when the pressure on the cap is removed the axial turning of the feed-tube, as it is retracted by the spring H, will engage one of its notches *c*² with the traveler-pawl *e*, to lock the lead against backward movement and hold it in position for writing, as will readily be understood.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pencil, the combination of a casing, a lengthwise-slotted feeding-tube having rack teeth or notches along one side of its slot and being movable longitudinally and rotarily within the casing, a lengthwise-slotted lead-tube within the feeding-tube, a traveler within the lead-tube having a spring-pawl extending through the slot of the lead-tube into the slot of the feeding-tube and capable of engaging and being disengaged from the teeth of the feed-tube by a partial rotation of the feed-tube relatively with the lead-tube and trav-

eler, and means for actuating said feed-tube from the outside of the casing, substantially as described.

2. In a pencil, the combination of a casing, a feeding-tube within the same having a lengthwise slot and teeth or notches along one side of the slot, a lengthwise-slotted lead-tube within the feeding-tube, said lead and feed tubes being relatively provided, one with an oblique slot and the other with a pin entering the slot and having play only lengthwise of it, whereby said tubes are adjustable relatively to each other only in a continuous oblique rotary lengthwise motion, and a traveler provided with a spring-pawl which is engaged by the teeth of the feed-tube in its forward movement and capable of clicking past or underneath said teeth during its backward movement, and means for operating said feed-tube from the outside of the casing, substantially as described.

3. In a pencil, the combination of a lengthwise-slotted feeding-tube having rack-teeth or notches along one side of the slot, a longitudinally-slotted lead-tube within the feeding-tube, said lead and feed tubes being relatively provided one with an oblique slot and the other with a pin entering the slot and having play only lengthwise of it, and a traveler having a spring-pawl capable of engaging the rack of the feed-tube and of being disengaged therefrom by a partial rotation of said tube around the lead-tube, substantially as described.

4. A pencil made with a lengthwise-slotted lead-holding tube, a traveler held therein and adapted to project the lead and provided with a spring-pawl, a feed-tube outside the lead-tube, said lead-tube and feed-tube being relatively provided one with an oblique slot and the other with a pin entering the slot and having play only lengthwise of it, said feed-tube also provided with a lengthwise slot and teeth or notches at one side thereof adapted to engage the traveler-pawl, said pawl engaged by the teeth of the feed-tube in its forward movement and clicking past or underneath said teeth during its backward movement, and a spring interposed between the lead and feed tubes, all combined for operation substantially as described.

5. A pencil made with a lengthwise-slotted lead-holding tube, a traveler held in the tube and adapted to project the lead and provided with a spring-pawl, a feed-tube outside the lead-tube, said lead-tube and feed-tube being relatively provided one with an oblique slot and the other with a pin entering the slot and having play only lengthwise of it, said feed-tube also provided with a lengthwise slot and teeth or notches at one side thereof adapted to receive the traveler-pawl, said pawl engaged by the teeth of the feed-tube in its forward movement and clicking past or underneath said teeth during its backward movement, a loose cap on the lead-tube, and a spring interposed between this cap and the

feed-tube, all combined for operation substantially as described.

6. In a pencil, the combination, with a lengthwise-slotted feed-tube having a rack or teeth along one side of the slot, a lengthwise-slotted lead-tube in the feed-tube having serrations along that side of the slot farthest from the toothed side of the feed-tube slot, and a traveler in the lead-tube having a pawl or stud entering the slots of the lead and feed tubes and adapted for engagement by the lead-tube-slot serrations, substantially as described.

7. In a pencil, the combination of a lengthwise-slotted feeding-tube having a rack or teeth along one side of the slot, a lengthwise-slotted lead-tube within the feed-tube having serrations along that side of its slot farthest from the toothed side of the feed-tube slot, said lead-tube and feed-tube being relatively provided one with an oblique slot and the other with a pin entering the slot and having play only lengthwise of it, and a traveler having a spring-pawl capable of engaging the rack of the feed-tube and of being disengaged therefrom by a partial rotation of said tube, substantially as described.

8. The combination, in a pencil, of a casing A, a cap B thereon, a feed-tube C in the casing and having a lengthwise slot *c*, with teeth or notches along one side, and an oblique slot G, a tube D in the tube C and having a lengthwise slot *d*, serrated at *d*³ at one edge, and a pin or stud I entering the feed-tube slot G, a traveler in the tube D and having a spring-pawl adapted to the tube-slots *c d* and to the teeth and serrations of the feed and lead tubes, and a spring H between the ends of the lead and feed tubes, substantially as described.

9. The combination, in a pencil, of a casing A, a cap B thereon, a feed-tube C in the casing and having a lengthwise slot *c*, with teeth or notches along one side, and an oblique slot G, a lead-holding tube in the tube C and having a lengthwise slot *d* and a pin or stud I entering the feed-tube slot G, a traveler in the lead-tube, having a spring-pawl adapted to the slots *c d* and to the teeth of the feed-tube, and a spring H between the ends of the lead and feed tubes, substantially as described.

10. In a pencil, the combination, with a feed-tube and a longitudinally-slotted lead-tube, of a traveler within the lead-tube and provided with a spring-pawl, the tension or flexure of said spring-pawl being in an outward direction to project its free end through the slot of the lead-tube into engagement with the feed-tube from the inside of the latter, substantially as described.

11. In a pencil, the combination, with a feed-tube and a longitudinally-slotted lead-tube, of a traveler arranged within the lead-tube and provided with a spring-pawl, the flexible shank of the said spring-pawl lying mainly within the peripheral plane of the lead-tube, and the tension or flexure of said pawl being in an outward direction to project the free end of the pawl through the slot of the lead-tube into engagement with the feed-tube, substantially as described.

12. In a pencil, the combination, with a feed-tube having a longitudinal series of teeth or shoulders and a longitudinally-slotted lead-tube within the feed-tube, of a traveler arranged within the lead-tube and provided with a spring-pawl, said spring-pawl lying mainly within the peripheral plane of the lead-tube, its free end projecting through the slot of the said lead-tube to engage with the teeth or shoulders of the feed-tube from the inside of the latter and disengaging by a rotary movement of the feed-tube relatively to the lead-tube, substantially as described.

13. In a pencil, the combination, with a feed-tube having a longitudinal slot or way and a series of teeth at the side thereof and a longitudinally-slotted lead-tube within the feed-tube, of a traveler within the lead-tube, and a spring-pawl carried by the traveler, said spring-pawl lying mainly within the peripheral plane of the lead-tube, and the tension of the said pawl acting in an outward direction to project the free end thereof through the slot of the lead-tube and into engagement with the teeth of the feed-tube, the pawl disengaging from the feed-tube by a rotary movement of the latter relatively to the lead-tube, substantially as described.

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Witnesses:

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